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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YUN, JURIE

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,977

Applicant(s)

UENO ET AL.

Examiner

Jurie Yun

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19, 20, 24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-18, 21-23 and 26 is/are rejected.
- 7) ☒ Claim(s) 27-29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 5/9/05 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5-7, 9, 11-16, 18, 21, 22, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Limkeman et al. (USPN 6,661,866 B1) in view of Melen et al. (USPN 6,175,611 B1) and Wong (USPN 4,677,299).

4. With respect to claims 1, 5, 9, and 16, Limkeman et al. disclose a radiological imaging apparatus comprising: a ring-shaped detector support member (10) which extends in the longitudinal direction (W) of a bed (14) for supporting an examinee and is arranged around said bed; and a radiation detection apparatus (11) including a plurality of radiation detector units (see Fig. 3) arranged in the longitudinal direction of said bed and around said bed, wherein said detector unit comprises a plurality of radiation detectors for detecting radiation and is provided with some of said radiation detectors for detecting said radiation that has passed through other said radiation detectors; an X-ray source (50) which moves around said bed and radiates X-rays; and wherein said detector unit comprises a plurality of radiation detectors for detecting radiation; and wherein said detector unit is provided with a plurality of radiation detectors which detect gamma-rays, some of said radiation detectors which detect said gamma-rays that have

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passed through other said radiation detectors and a signal processing apparatus for gamma-ray detection signals outputted from said radiation detectors (Fig. 1, 70 – “PET Proccssor”); and wherein said detector unit is provided with a plurality of radiation detectors for detecting radiation and some of said radiation detectors for detecting said radiation that has passed through other said radiation detectors, and at least said some radiation detectors output both said X-ray detection signals and gamma-ray detection signals (Abstract, last line).

Limkeman et al. do not disclose said plurality of detector units being attached to said detector support member in a detachable manner. Melen et al. disclose a plurality of detector units being attached to a detector support member (Fig. 5, 508) in a detachable manner (via screws). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of detachable detectors to the Limkeman et al. apparatus, for ease of servicing. It would also achieve cost savings when replacing individual detectors instead of the whole array.

Limkeman et al. do not disclose a gamma-ray detection signal processing apparatus for obtaining positional information of the radiation detectors outputting gamma-ray detection signals, said radiation detectors outputting gamma-ray detection signals being arranged in a radius direction of the detector support member. Wong discloses a gamma-ray detection signal processing apparatus for obtaining positional information of the radiation detectors outputting gamma-ray detection signals, said radiation detectors (20 & 22) outputting gamma-ray detection signals being arranged in a radius direction of the detector support member (14). It would have been obvious to

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one of ordinary skill in the art at the time the invention was made to further modify Limkeman et al. to have a gamma-ray detection signal processing apparatus for obtaining positional information of the radiation detectors outputting gamma-ray detection signals, the Limkeman et al. radiation detectors outputting gamma-ray detection signals being arranged in a radius direction of the detector support member, to improve image resolution, as taught by Wong.

5. With respect to claims 2, 6, 12, 13, 15, and 26, Melen et al. disclose the detector unit comprises: a detector support substrate (Fig. 3, 316) attached to said detector support member (Fig. 5, 508) in a detachable manner; the plurality of some of said radiation detectors and the plurality of said other radiation detectors arranged on said detector support substrate. Melen et al. do not disclose a plurality of wires provided for said detector support substrate and connected to each of said radiation detectors for transmitting detection signals outputted from said radiation detectors, wherein the wires are provided in said detector support substrate. However, Melen et al. disclose indium bumps (Fig. 7, 712) and bond pads (716) provided in the substrate for transmitting detection signals outputted from the radiation detectors, and it would have been obvious to one of ordinary skill in the art that these were both well known in the art and would have been a design choice to use one over the other.

6. With respect to claims 3 and 7, Limkeman et al. disclose an image creation apparatus (Fig. 1, 74) which creates images of said examinee using the output signals of said radiation detectors.

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7. With respect to claims 11 and 14, Limkeman et al. disclose an image creation apparatus (Fig. 1, 70 & 74) which creates images including areas where radiopharmaceutical in the body of said examinee is concentrated using the output information from said signal processing apparatus.

8. With respect to claim 18, Limkeman et al. disclose said some radiation detectors and said other radiation detectors are arranged rectilinearly (see Fig. 3).

9. With respect to claim 21, Limkeman et al. disclose a tomographic image creation apparatus which creates tomographic images using first information obtained from said gamma-ray detection signals and second information obtained from said X-ray detection signals (column 5, lines 63+).

10. With respect to claim 22, Limkeman et al. disclose (column 5, lines 63+) a first gamma-ray signal processing apparatus for getting said gamma-ray detection signals from said first radiation detectors which output both said X-ray detection signals and said gamma-ray detection signals and an X-ray signal processing for getting said X-ray detection signals provided for each of said first radiation detectors; a second gamma-ray signal processing apparatus for getting said gamma-ray detection signals from said second radiation detectors which do not output said X-ray detection signals but output said gamma-ray detection signals provided for each of said second radiation detectors; a counting apparatus which receives output signals from said first gamma-ray signal processing apparatus and said second gamma-ray signal processing apparatus and outputs information such as position information of each of a pair of said radiation detectors which have detected said gamma-rays within a set time and count information

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of said detected gamma-rays; and a tomographic image creation apparatus which creates tomographic image information using said position information, said count information and output information of said X-ray signal processing apparatus. Although Limkeman et al. do not go into the details of the counting apparatus, it is inherent in the system since it is disclosed to be an integrated CT-PET system.

11. Claims 4, 8, 10, 17, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Limkeman et al. (USPN 6,661,866 B1) in view of Melen et al. (USPN 6,175,611 B1) and Wong (USPN 4,677,299) as applied to claims 1, 5, 9, 16, and 22 above, and further in view of Saoudi et al. (USPN 6,448,559 B1).

12. With respect to claims 4, 8, 10, 17, and 23, Limkeman et al. do not disclose the radiation detectors are semiconductor radiation detectors. Saoudi et al. disclose semiconductor radiation detectors (column 5, lines 62-67). Specifically, Saoudi et al. teach that detector assemblies with scintillators could be used as well as semiconductor detectors including CdTe and CdZnTe based detectors "without departing from the spirit and nature of the present invention." It would have been obvious to one of ordinary skill in the art at the time the invention was made to use semiconductor radiation detectors in the Limkeman et al./Melen et al./Wong apparatus, because these are cheaper and would result in additional cost savings.

Allowable Subject Matter

13. Claims 27-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: Prior art fails to disclose a radiological imaging apparatus wherein the radiation detectors comprise at least three semiconductor elements each having at least two surfaces, and detection signal output electrodes and common potential electrodes are alternately arranged between the different semiconductor elements, as claimed in claim 27. Prior art fails to disclose a radiological imaging apparatus wherein the radiation detectors comprise a plurality of semiconductor members arranged in parallel and detection signal output electrodes and common potential electrodes which are alternatively arranged in connection with the detection signal output electrodes and common potential electrodes, as claimed in claim 28. Prior art fails to disclose a radiological imaging apparatus wherein the radiation detectors comprise a plurality of semiconductor members arranged in parallel and detection signal output electrodes and common potential electrodes which are alternatively arranged in connection with the semiconductor members positioned between the detection signal output electrodes and common potential electrodes, as claimed in claim 29.

15. Claims 19, 20, 24, and 25 are allowed.

16. The following is a statement of reasons for the indication of allowable subject matter: Prior art fail to disclose a radiological imaging apparatus comprising an X-ray

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source transport apparatus which transports said X-ray source in said longitudinal direction, as claimed in claim 19. Prior art fails to disclose a radiological imaging apparatus wherein the semiconductor radiation detectors comprise three or more semiconductor elements having at least two surfaces and arrange anode electrodes and cathode electrodes alternately between said different semiconductor elements, as claimed in claim 24. Prior art fails to disclose a radiological imaging apparatus wherein the semiconductor radiation detector has a multilayered structure with an even number of semiconductor elements, forms common anode electrodes and cathode electrodes between said adjacent semiconductor elements in said semiconductor radiation detectors and forms common cathode electrodes on both the mutually facing sides of the adjacent semiconductor radiation detectors, as claimed in claim 25.

Response to Arguments

17. Applicant's arguments with respect to claims 1-18 and 21-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ichihara (USPN 4,639,599) discloses a ring type single-photon emission CT imaging apparatus.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 Jurie Yun
July 27, 2005



Craig E. Church
Primary Examiner